AMENDED CLAIMS

[received by the International Bureau on 13 September 2004 (13.09.04); original claims 1-53 replaced by amended claims 1-54 (12 pages)]

1. Functional transitional metal silicates (FTMS) having transitional metal to silica ratio in the range of 0.34 to 19.57, variable functions resulting from different metal silicate ratios and also having variable functional structure for same transitional metal to silica ratio , exhibiting properties selected from the group comprising of decontaminant , disinfectant, protectant, microbicide or combination thereof and prepared by the process comprising the steps of:
   a. adding a transitional metal salt solution to a soluble alkali silicate solution to form a mixture;
   b. forming a precipitate of a transitional metal silicate, and
   c. washing and drying the precipitate thus formed to obtain the transitional metal silicate

   characterized in that in step (a), the ratio between the transitional metal salt solution to the alkali silicate solution is varied, the temperature at which the solutions are mixed is varied between 20° to 90°C, and the pH of the medium is varied between extremely acidic condition to extremely basic condition, preparing variable functional structure for same transitional metal to silica ratio at varied conditions, also having variable functional structure for same transitional metal to silica ratio, and said FTMS capable of being immobilized on a suitable material or incorporating into resins and /or coating along with resins on suitable materials.

2. Functional transitional metal silicates (FTMS) having transitional metal to silica ratio in the range of 0.34 to 19.57, variable functions resulting from different metal silicate ratios and also having variable functional structure for same transitional metal to silica ratio , exhibiting properties selected from the group comprising of decontaminant , disinfectant, protectant, microbicide or combination thereof and prepared by the process comprising the steps of:
   a. adding a transitional metal salt solution to a soluble alkali silicate solution to form a mixture;
   b. forming a precipitate of a transitional metal silicate, and
   c. washing and drying the precipitate thus formed to obtain the transitional metal silicate

   characterized in that in step (a), the ratio between the transitional metal salt solution to the alkali silicate solution is varied, the temperature at which the

solutions are mixed is varied between 20° to 90°C, and the pH of the medium is varied between extremely acidic condition to extremely basic condition..

3. Functional transitional metal silicate as claimed in claims 1 or 2, wherein the same are selected from the group consisting of cupric silicate, silver silicate, zinc silicate, manganese silicate, zirconium silicate and combinations thereof.
4. Functional transitional metal silicate as claimed in claims 1 or 2, wherein the transitional metal salt solution is a transitional metal chloride solution or a transitional metal sulphate solution or a transitional metal nitrate solution or any other transitional metal salt solution such as acetate.
5. Functional transitional metal silicate as claimed in claims 1 or 2, wherein the alkali silicate solution is sodium silicate or potassium silicate solution or any other alkali silicate solution such as calcium silicate.
6. Functional transitional metal silicate as claimed in claim 3, wherein the cupric silicate has silicate to copper ratio in the range of 1:0.78 to 1:5.15.
7. Functional transitional metal silicate as claimed in claim 6, wherein cupric silicate having silicate to copper ratio of about 1:5.15 possessed the following properties when prepared under acidic conditions:
   characteristic g values of the peaks as obtained by the electron spin resonance spectrometer being (a) 4.3; (b) 2.5; (c) 2.3; (d) 2.0 and (e) 2.0;
   X-ray diffraction analysis having 3 significant peaks at 16.2 , 32.2 and 39.7 having peak heights of 2128, 1593 and 1470 respectively;
   exhibiting decontamination property of metals such as arsenic, bacterial disinfecting property, anti-bacterial property, antifungal property, viruses disinfecting property and chemical pollutant decontamination property .
8. Functional transitional metal silicate as claimed in claim 6, wherein cupric silicate having silicate to copper ratio of about 1:1 possessed the following properties when prepared under neutral conditions:
   characteristic g values of the peaks as obtained by the electron spin resonance spectrometer being (a) 3.1; (b) 2.3; (c) 2.0; (d) 1.2 and (e) 0.9;
   X-ray diffraction analysis having 3 significant peaks at 16.1, 32.2 and 39.7 having peak heights of 940, 764 and 694 respectively;
   exhibiting decontamination property of metals such as arsenic, bacterial disinfecting property and antifungal property.
9. Functional transitional metal silicate as claimed in claim 6, wherein cupric

silicate having silicate to copper ratio of about 1:0.8 possessed the following properties when prepared under acidic conditions and at70^0 C to 90^0 C:
characteristic g values of the peaks as obtained by the electron spin resonance spectrometer being (a) 2.2 and (b) 2.0;
X-ray diffraction analysis having 3 significant peaks at 16 , 32 and 39having peak heights of 835, 706 and502 respectively;
exhibiting decontamination property of metals such as arsenic .and bacterial disinfecting property.

10. Functional transitional metal silicate as claimed in claim 6, wherein cupric silicate having silicate to copper ratio of about 1:0.8 possessed the following properties when prepared under basic conditions:
characteristic g values of the peaks as obtained by the electron spin resonance spectrometer being (a) 3.7 and (b) 3.2 and (c) 2.6;
X-ray diffraction analysis having 1 significant peak at 26.64 having peak height of 152.

11. Functional transitional metal silicate as claimed in claim 6, wherein cupric silicate having silicate to copper ratio of about 1:0.53.possessed the following properties when prepared under extremely acidic conditions:
characteristic g values of the peaks as obtained by the electron spin resonance spectrometer being (a) 2.1, (b) 2.0 and (c) 2.1;
X-ray diffraction analysis having 3 significant peaks at 16.1, 32.2 and 39.71 having peak heights of 400, 394and 330 respectively;
exhibiting decontamination property of metals such as arsenic and bacterial disinfecting property.

12. Functional transitional metal silicate as claimed in claim 6, wherein cupric silicate having silicate to copper ratio of about 1:0.34 possessed the following properties when prepared under extremely acidic conditions:
characteristic g values of the peaks as obtained by the electron spin resonance spectrometer being (a) 2.1, and (b) 2.0;
X-ray diffraction analysis having 3 significant peaks at 16.2, 32.3 and 39.8 having peak heights of 541, 414 and 365 respectively;
exhibiting decontamination property of metals such as arsenic and bacterial disinfecting property.

13. Functional transitional metal silicate as claimed in claim 3, wherein the zinc

silicate has silicate to zinc ratio in the range of 1:2.46 to 1:12.13.

14. Functional transitional metal silicate as claimed in claim 13, wherein zinc silicate having silicate to zinc ratio of about 1:12.13 possessed the following properties when prepared under neutral conditions:
characteristic g values of the peaks as obtained by the electron spin resonance spectrometer being (a) 5.4; (b) 4.5; (c) 2.5; (d) 2.1 and (e) 2.0;
X-ray diffraction analysis having 3 significant peaks at 32.7, 59.5 and 26.2 having peak heights of 444, 307 and 263 respectively; decontamination property of metals such as arsenic, bacterial disinfecting property and anti-bacterial property.

15. Functional transitional metal silicate as claimed in claim 13, wherein zinc silicate having silicate to zinc ratio of about 1:2.46 possessed the following properties when prepared under extremely acidic conditions:
characteristic g values of the peaks as obtained by the electron spin resonance spectrometer being (a) 4.3; (b) 4.0; (c) 2.5; (d) 1.8 and (e) 2.0;
X-ray diffraction analysis having 3 significant peaks at 11.0, 33.5 and 32.8 having peak heights of 2079, 835 and 664 respectively;
exhibiting decontamination property of metals such as arsenic and bacterial disinfecting property.

16. Functional transitional metal silicate as claimed in claim 3, wherein the silver silicate has silicate to silver ratio in the range of 1:1.04 to 1:19.57.

17. Functional transitional metal silicate as claimed in claim 16, wherein silver silicate having silicate to silver ratio of about 1:19.57 possessed the following properties when prepared under neutral conditions:
characteristic g values of the peaks as obtained by the electron spin resonance spectrometer being (a) 4.3; (b) 2.3; (c) 3.9 and (d) 2.0;
X-ray diffraction analysis having 3 significant peaks at 32.2, 46.2 and 27.8 having peak heights of 3945, 2421 and 1835 respectively; exhibiting bacterial disinfecting property.

18. Functional transitional metal silicate as claimed in claim 16, wherein silver silicate having silicate to silver ratio of about 1:1.04 possessed the following properties when prepared under extremely acidic conditions:
characteristic g values of the peaks as obtained by the electron spin resonance spectrometer being (a) 4.3; (b) 4.0 and (c) 1.9;

X-ray diffraction analysis having 3 significant peaks at 29.3, 47.6 and 42.3 having peak heights of 2217, 684and 674 respectively;
exhibiting decontamination property of metals such as arsenic and bacterial disinfecting property.

19. Functional transitional metal silicate as claimed in claim 3, wherein the manganese silicate has silicate to manganese ratio in the range of 1:1.94 to 1:1.09.

20. Functional transitional metal silicate as claimed in claim 19, wherein manganese silicate having silicate to manganese ratio of about 1:1.94 possessed the following properties when prepared under neutral conditions:
characteristic g values of the peaks as obtained by the electron spin resonance spectrometer being (a) 1.93and (b) 2.06;
X-ray diffraction analysis having 1 significant peak at 30.6having peak height of 148.0; exhibiting bacterial disinfecting property.

21. Functional transitional metal silicate as claimed in claim 19, wherein manganese silicate having silicate to manganese ratio of about 1:1.09 possessed the following properties when prepared under extremely acidic conditions:
characteristic g values of the peaks as obtained by the electron spin resonance spectrometer being (a) 4.3; (b) 4.1; (c) 2.1;(d) 2.1; (e) 2.0 and (f) 1.9;
X-ray diffraction analysis having 1 significant peak at 24.6 having peak height of 32.8; exhibiting bacterial disinfecting property.

22. Functional transitional metal silicate as claimed in claim 3, wherein the zirconium silicate has silicate to zirconium ratio in the range of 1:2.90 to 1:0.77.

23. Functional transitional metal silicate as claimed in claim 22, wherein zirconium silicate having silicate to zirconium ratio of about 1:2.90 possessed the following properties when prepared und decontamination property of metals such as arsenic at neutral conditions:
characteristic g values of the peaks as obtained by the electron spin resonance spectrometer being (a) 4.4; (b) 4.1; (c) 2.2;(d) 2.3; (e) 2.1 and (f) 1.2;
exhibiting decontamination property of metals such as arsenic.

24. Functional transitional metal silicate as claimed in claim 22, wherein zirconium silicate having silicate to zirconium ratio of about 1:0.77 possessed

the following properties when prepared under extremely acidic conditions:
characteristic g values of the peaks as obtained by the electron spin resonance spectrometer being (a) 4.3; (b) 2.8; (c) 1.9;(d) 1.2; (e) 1.0 and (f) 0.9;
X-ray diffraction analysis having 1 significant peak at 10.8 having peak height of 84.80;
exhibiting and bacterial disinfecting property.

25. Functional transitional metal silicate as claimed in claims 1 or 2, wherein the same is effective as a decontaminant of metals, chemicals, pesticides, microbes or combinations thereof.

26. Functional transitional metal silicate as claimed in claims 1 or 2, wherein the same is effective as a disinfectant of a protozoan ,a bacteria, a fungus, a virus, a microbicide or combinations thereof.

27. Functional transitional metal silicate as claimed in claim 1 or 2, wherein the same is effective as a detoxificant of carbon monoxide, sulphur dioxide, an oxide of nitrogen, a hydrocarbon, tobacco tar, nicotine, or toxic gases or chemical conversion of toxic gases and /or toxic chemical containing gases into their non-toxic form, or combinations thereof.

28. Functional transitional metal silicate as claimed in claim 1 or 2, wherein the same is effective as a decontaminant of trihalomethanes, proteins, semi-volatile organic compounds, volatile organic compounds, phenols, polychlorinated biphenyls and engine combustion gas.

29. Functional transitional metal silicate as claimed in claim 26, wherein the bacteria is coliform bacteria, a Gram positive bacteria, a Gram negative bacteria or combinations thereof.

30. Functional transitional metal silicate as claimed in claim 26, wherein the fungus is pathogenic fungi such as Sclerotium rolfsii, Rhizoctonia solani, Fusarium oxysporium, Pyricularia oryzae or combinations thereof.

31. Functional transitional metal silicate as claimed in claim 26, wherein the virus is infective in nature.

32. A process for preparing immobilized functional transitional metal silicates (FTMS) having transitional metal to silica ratio in the range of 0.34 to 19.57, having variable structure for same transitional metal to silica ratio, also having the variable functional structure for same transitional metal to silica ratio, exhibiting properties selected from the group comprising of decontaminant,

disinfectant, protectant, microbicide or combination thereof, said process comprising the steps of:

a. adding a transitional metal salt solution to a substrate to form a first product;

b. adding a solution comprising a silicate to the first product to form a second product, and

c. removing the non-immobilized material from the second product to form the immobilized transition metal silicate;

characterized in that the amount of the transitional metal salt solution, the alkali silicate solution added are varied, temperature at which the solutions are mixed is varied between 20° to 90°C, and the pH of the medium is varied between extremely acidic condition to extremely basic condition.

33. The process as claimed in claim 32 wherein the substrate is selected from the group consisting of agropolymers, activated alumina, aluminium oxide, cellulose, quartz sand, silica gel and combinations thereof.

34. The process as claimed in claim 32 wherein the resins are selected from the group consisting of vinyl ester resin, a bisphenol resin, an isopthalic food grade resin and combinations thereof.

35. Functional transitional metal silicate as claimed in claim 1, wherein the same is immobilized on materials such as activated alumina, aluminium oxide, agropolymers, cellulose, quartz sand, silica gel, and functional transitional metal silicates incorporated resins and functional transition metal silicate containing resin coated sand are capable of decontaminating metals such as arsenic, mercury, etc., and this property enables immobilized functional transition metal silicates utility to purify metal contaminated drinking water, ground water and any other metal polluted aqueous streams.

36. Functional transitional metal silicate as claimed in claim 1, wherein the same is immobilized on materials such as activated alumina, aluminium oxide, agropolymers, cellulose, quartz sand, silica gel, and functional transitional metal silicates incorporated resins and functional transition metal silicate containing resin coated sand are capable of disinfecting coliform bacteria, from water and this property enables immobilized functional transition metal silicate utility to purify water free of harmful microbes.

37. Functional transitional metal silicate as claimed in claim 1, wherein the same

is immobilized on materials such as activated alumina, aluminium oxide, agropolymers, cellulose, quartz sand, silica gel, and functional transition metal silicates incorporated resins and functional transition metal silicate containing resin coated sand are capable of detoxifying toxic gases such as carbon monoxide, sulphur dioxide, nitrous oxide and hydrocarbons from combustion gases and this property enables these immobilized functional transition metal silicate containing filters usage as toxic air purifiers,chemical purifiers, chemical conversion of toxic gases and /or toxic chemical containing gases into their non-toxic form.

38. Functional transitional metal silicate as claimed in claim 1, wherein the same is immobilized on materials such as activated alumina, aluminium oxide, agropolymers, cellulose, quartz sand, silica gel and functional transition metal silicates incorporated resins and functional transition metal silicate containing resin coated sand are capable of decontaminating pesticides such as chlorinated hydrocarbons (such as endosulphan), synthetic pyrethroides (such as cypermethrin) organophosphates(such as chloripyriphos) and this property enables these immobilized functional transition metal silicates as decontaminants of pesticides.

39. Functional transitional metal silicate as claimed in claim 1, wherein the same is immobilized on materials such as activated alumina, aluminium oxide, agropolymers, cellulose, quartz sand, silica gel and functional transition metal silicates incorporated resins and functional transition metal silicate containing resin coated sand are capable of decontaminating proteins from an aqueous medium enabling their usage to remove or decontaminate proteins from waste waters generating from bioprocess industry, to prevent undesirable protein contamination.

40. Functional transitional metal silicate as claimed in claim 1, wherein the same is immobilized on materials such as activated alumina, aluminium oxide, agropolymers, cellulose, quartz sand, silica gel and functional transition metal silicates incorporated resins and functional transition metal silicate containing resin coated sand are capable of decontaminating fungus from water and this property enables the usage of immobilized functional transition metal silicates for protection and or control of fungal infections.

41. Functional transitional metal silicate as claimed in claim 1, wherein the same

is immobilized on agropolymers are capable of decontaminating protozoan: (Cryptosporidium parvum) from water and this property enables the usage of immobilized functional transition metal silicates for protection and or control of protozoan infections.

42. Functional transitional metal silicate as claimed in claim 1, wherein the same is immobilized on materials such as activated alumina, aluminium oxide, agropolymers, cellulose, quartz sand, silica gel are capable of decontaminating polio viruses, rota viruses from water and this property enables their usage of immobilized functional transition metal silicates for protection and or control of pathogenic viruses infections.

43. Functional transitional metal silicate as claimed in claim 1, wherein the same is immobilized on materials such as activated alumina, aluminium oxide, agropolymers, cellulose, quartz sand, silica gel and functional transition metal silicates incorporated resins and functional transition metal silicate containing resin coated sand are capable of decontaminating trihalomethanes selected from the group consisting of chloroform, 1,1,1, trichloroethane, tetrachloroethylene, trichloroethylene, bromodichloroethane, dibromochloroethane, tetrachloroethylene, bromoform, 1,2, dichloro-3-bromopropane.

44. Functional transitional metal silicate as claimed in claim 1, wherein the same is immobilized on materials such as activated alumina, aluminium oxide, agropolymers, cellulose, quartz sand, silica gel and functional transition metal silicates incorporated resins such as vinyl ester, bisphenol and isopthalic food grain resins and functional transition metal silicate containing resin coated sand are capable of decontaminating Polychlorinated biphenyls selected from the group consisting of 2,3-dichlorobiphenyl, trichlorobiphenyl, tetrachlorobiphenyl, pentachlorobiphenyl, hexachlorobiphenyl, heptachlorobiphenyl, octachlorobiphenyl.

45. Functional transitional metal silicate as claimed in claim 1, wherein the same is immobilized on materials such as activated alumina, aluminium oxide, agropolymers, cellulose, quartz sand silica gel and functional transition metal silicates incorporated resins such as vinyl ester, bisphenol and isopthalic food grain resins, and functional transition metal silicate containing resin coated sand are capable of decontaminating volatile organic compounds selected

from the group consisting of 1,1,1, trichloroethane; 1,1,2-trichloroethane; 1,3-dichloropropane; dibromochloromethane; ethane 1,2 dibromo; chlorobenzene; benzene 1,2-dimethyl; , benzene 1,3-dimethyl; orthoxylene; benzene 1-methylethyl; ethane 1,1,2,2-tetrachloro; bromobenzene; 2-chloro toluene; benzene, propyl; benzene, 1chloro 4-methyl; benzene 1,2,3-trimethyl; 4-iso propyl toluene; benzene 1,2-diethyl; benzene 1,2-dichloro; 1,3-dichlorobenzene; 1,4-dichlorobenzene; toluene; n-butylbenzene; 1,2-dibromo 3-chloropropane; 1,2,4-trichlorobenzene; naphthalene; benzene 1,2,3-trichloro; benzene 1,3,5-trichloro; benzene 1,3,4-trichloro; 1,3-butadiene1,1,2,3,4; benzene 2-bromo 1,3,5; nitrobenzene; styrene; benzylbenzoate; 1,2,3,4-tetramethylbenzene; benzene 1-chloro 2-propyl; 4-bromo 3-chloroanilene.

46. Functional transitional metal silicate as claimed in claim 1, wherein the same is immobilized on materials such as activated alumina, aluminium oxide, agropolymers, cellulose, quartz sand, silica gel and functional transition metal silicates incorporated resins such as vinyl ester, bisphenol and isopthalic food grain resins, and functional transition metal silicate containing resin coated sand are capable of decontaminating semi volatile organic compounds selected from the group consisting of 1,4-dichloro; ethane hexachloro; benzene 1,2,3, trichloro; 1,3 butadiene, 1,1,2,3,4; naphthalene, 2-chloro; acenephthylene; acenapthene; phenol, 2,4-bis (1,1-imet); diethyl phthalate; fluorene; benzene1-chloro-3phenol; diphenylamine; 4-bromophenyl-phenylether; benzene, hexachloro; phenantherene; anthracene; dibutyl phthalate; fluoranthene; pyrene; benzyl butyl phthalate; chrysene; bis(2-ethylhexy)phthalate; phenol, 2,3,4,5-tetrabrom; di-n-octyl phthalate; benzo (b) fluoranthene; benzo(k) fluoranthene; benzo(a) pyrene; indeno(1,2,3-cd) pyrene; dibenzo(a,h) anthracene; benzo(g,h,l) perylene.

47. Functional transitional metal silicate as claimed in claim 1, wherein the same is immobilized on materials such as activated alumina, aluminium oxide, agropolymers, cellulose, quartz sand, silica gel and functional transition metal silicates incorporated resins such as vinyl ester, bisphenol and isopthalic food grain resins, and functional transition metal silicates containing resin coated sand are capable of decontaminating phenols such as benzoic acid; 2,4,5-trichlorophenol; 3-nitroaniline; 3-nitrophenol; 4-nitrophenol; 2,4-

dinitrophenol; 4-nitroaniline; pentachlorophenol.

48. Functional transitional metal silicate as claimed in claim 1, wherein the same is incorporated into resins and the resin is coated on quartz sand or the quartz sand coated with functional transitional metal silicate have utility of decontamination and disinfection in high temperature zones such as boilers etc., due to thermo stability of this material.

49. Functional transitional metal silicate as claimed in any of the above claims, wherein the same exhibited microbicidal nature against bacteria, fungus and viruses enabling functional transition metal silicates usage as microbicides.

50. Functional transitional metal silicate as claimed in any of the above claims, wherein the same possesses high thermal stability, decontamination and disinfection property and can be used in high temperature zones such as those existing in boilers.

51. Functional transitional metal silicate as claimed in any of the above claims, wherein the same having varied metal silicate ratio exhibiting varied functions gives a method to obtain selective conjugates of transition metals along with silicates for obtaining functionally effective functional transition metal silicates to use in various other applications such as manufacturing of catalysts, and hybridizing or doping with zeolites to impart desirable properties such as anti-microbial nature etc.

52. Functional transitional metal silicate as claimed in claim 1, wherein the same is capable of disinfecting gram positive and gram negative bacteria, fungus, and viruses enabling the usage of these novel functional transition metal silicates in detergents, deodorants, cleaning solutions, seed coat treatments, disinfectants, paints, plastics, paper, shampoos etc., for protection against microbial infections.

53. Functional transitional metal silicate as claimed in any one of the aforesaid claims, wherein achieving of an inclusion of a desired functionality in a selected functional transition metal silicate is attainable by optimization of synthetic conditions out of variable functions resulting from different metal silicate ratios (Examples: Inclusion of arsenic sequestration ability into silver silicate, inclusion of bacterial decontamination property into zirconium silicate, inclusion of effective bactericidal and fungicidal property into cupric silicate).

54. Functional transitional metal silicate as claimed in any one of the aforesaid claims, wherein achieving of an inclusion of a desired functionality in a selected functional transition metal silicate is attainable by optimization of synthetic conditions out of variable functional structures for same transitional metal to silica ratio (Example: cupric silicate having same silicate to copper ratio when prepared under acidic conditions had entirely different functional structure as compared to cupric silicate having same silicate to copper ratio and prepared under basic conditions).

STATEMENT UNDER ARTICLE 19(1)

In the present invention, the Inventor has for the first time identified that it is possible to incorporate desired function into a particular transitional metal silicate by varying the synthesis conditions. More particularly, the Inventor has noticed that transitional metal silicates having variable ratio of silicate to transition metal imparts properties that are complete variable. Further, a person skilled in the art would feel that if two transitional metal silicates are prepared having same/similar ratio of silicate to transition metal, their properties would be identical or similar. During the experimental procedures, the Inventor noticed that even if two transitional metal silicates are prepared with same ratio of silicate to transition metal, their properties need not be identical. However, as described above, during the experimental procedure, the Inventor has surprisingly noticed that the reaction conditions play a vital role on the structure of the transitional metal silicate even if they have same silicate to transitional metal ratio. Some of these reaction conditions that influence the incorporation of the transitional metal into the silicate matrix and therefore the structure of the structure of the transitional metal silicate thus obtained include temperature and pH.

For example, the Inventor noticed that cupric silicate having same silicate to copper ratio when prepared under acidic conditions had entirely different structure as compared to cupric silicate having same silicate to copper ratio and prepared under basic conditions.

More particularly, the Inventor noticed that cupric silicate having silicate to copper ratio of about 1:0.8 possessed the following properties when prepared under acidic conditions:

characteristic g values of the peaks as obtained by the electron spin resonance spectrometer being (a) 2.23480 and (b) 2.06456;

X-ray diffraction analysis having 3 significant peaks at 16.20057 , 32.23910 and 39.57159 having peak heights of 835.63, 706.74 and502.52 respectively;

exhibiting 99% bactericidal property.

as opposed to the following properties that are obtained when cupric silicate having silicate to copper ratio of about 1:0.8 is prepared under basic conditions:

characteristic g values of the peaks as obtained by the electron spin resonance spectrometer being (a) 3.71806 and (b) 3.23001 and (c) 2.61681;

X-ray diffraction analysis having 1 significant peak at 26.64983 having peak height of 152.74;

exhibited no significant bactericidal property.

The entire invention is based on the finding that transitional metal silicates having entirely different structures (as confirmed by ESR and XRD) are obtained when the reaction conditions during their synthesis are varied. These variations in the reaction conditions finally lead to unexpected variations in the properties of the transitional metal silicates thus obtained.

As none of the documents cited by the Examiner teach or suggest that it is possible to obtain transitional metal silicates with varied structures even with same silicate to transitional metal ratio, it is respectfully submitted that the findings of the present invention should be considered to lack novelty or inventiveness over the cited documents either taken individually or in combination.

The claims of the present invention have been amended to highlight this novel feature of the present invention. Amendments that have been carried out are fully supported by the description as originally filed and no new matter has been added.